

**How wire wrapping can save your  
company 50% on connection costs...**





# What is **WIRE WRAPPING?**

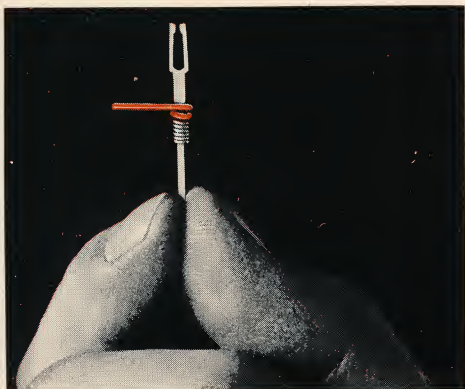
Wire wrapping is a proven concept in pressure connection for fastening wires to apparatus terminals to accomplish electrical conduction. The wire wrapped connection is achieved automatically by removing a portion of insulation, then wrapping the uninsulated wire, under controlled tension, around the terminal to form a metallurgical bond that is highly reliable.

The wire wrapped pressure connection provides clear advantages: • long life • high contact force • large contact area • ease of servicing • and a low cost method of interconnection.

The wire wrapped connection process provides several distinct advantages over other methods of connection.

- Lower Cost of Component Parts
- Higher Reliability
- Elimination of Human Error
- Longer Life
- Greater Density





## **How to put Raytheon's nationwide wire wrapping service to work for you**

1. First, fill out the blue Estimated Cost Savings form enclosed in the folder above. The results will be convincing evidence of the advantages Raytheon's wire wrapping service can offer your company.

2. Second, show the completed Cost Savings form to the people most concerned with production economy and the need for turning out a better product, faster.

Ask them to attend an in-plant seminar on wire wrapping techniques. List their names as well as a convenient date and time for the seminar.

3. Third, fill out and mail the Seminar Application form contained in the above folder. Your company is now on its way to cutting its connection costs and producing more reliable products.

**RAYTHEON**



For more information contact: *Mr. C. E. Russ, Manager, Wire Wrapping Service*  
*Raytheon Company, 20 Seyon Street, Waltham, Mass. 02154*  
*Telephone (617) 899-8400 ext. 2668.*

# RAYTHEON AUTOMATIC WIRE WRAPPING

## EQUIPMENT

Automatically attaching interconnecting wiring with solderless wrapped connections is accomplished with a Gardner-Denver Automatic Wire Wrap Machine. The machine consists of movable carriages containing wrapping-tool assemblies and dressing fingers that are positioned on modular points to form a desired wire pattern.

Automatic operation of the machine is initiated from a card reader which reads input data from a control card to translate the output of a computer program into mechanical motion which cuts, strips and wraps the wires around the terminal pins via intricate circuit patterns or wiring sequences. Each card contains the information necessary to attach one (1) piece of wire at both ends.

The input data is punched into control cards in either decimal, binary coded decimal or column binary code, depending on machine model.

Of the basic models of Automatic Wire Wrap Machines available, Raytheon utilizes one (1) 14F - 20 x 20 x .200" square grid for #24 AWG wire and six (6) 14F - 22 x 22 x .025" Universal type for #30, #26 and #24 AWG wire on .100", .125", .200" and .250" staggered grid centers. The Gardner-Denver Universal type machine is capable of positioning on any grid, as long as it is some increment of .025", which is the basic grid for this machine.

## HARDWARE CONFIGURATION

Sub-pallets and wiring pallets for above Wire Wrap Machines are a special design to facilitate wire wrapping hardware in sizes ranging from 3" x 5" to 22" x 42".

## WIRE

Our present facilities can wire wrap wire diameter sizes of #24 AWG, #26 AWG and #30 AWG wire, with PVC nylon-jacketed "Kynar", FEP w/nylon jacketed TFE "Teflon", and all the new high "cut-through" resisting insulations on #30 AWG wire.

## HARDWARE TERMINALS

Square and rectangular terminals are most commonly used. Our experience indicates that the square terminals offer some advantages over other types. The square terminal will not bend or break as readily during wrapping and bit life is increased.

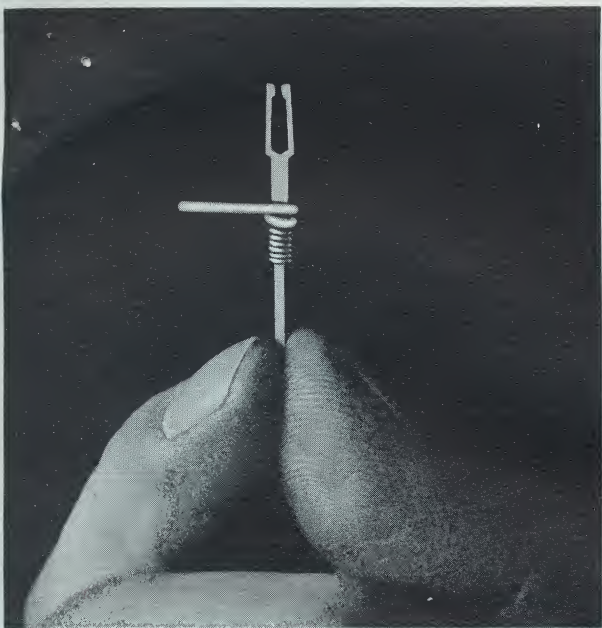
We have a set of wrapping bits that have wire wrapped a total of 802,415 wires which is a record on "Kynar" insulated wire.



Raytheon Company  
Waltham Operation  
20 Seyon Street  
Waltham, Mass. 02154  
Tel: (617) 899-8400







# Estimated Cost Savings Work Sheet

## *Instructions:*

- 1.** To obtain a rough cost comparison (labor only) between your present method of electrical connection and Raytheon's Wire Wrapping Service, complete the following:

### *Present Method:*

a. \_\_\_\_\_ connections annually @ \_\_\_\_\_ ¢ per connection =  
(quantity) (labor cost)  
\$ \_\_\_\_\_ total cost.

### *Automatic Wire Wrapping Method:*

b. \_\_\_\_\_ connections annually @ \*.0475¢ per connection =  
(quantity)  
\$ \_\_\_\_\_ total cost.

ANNUAL LABOR SAVINGS \$ \_\_\_\_\_  
(subtract line b from line a)

- 2.** A survey of industry indicates that average costs for various methods of connection are as follows:

### *Commercial*

|                   |                           |
|-------------------|---------------------------|
| Solder            | \$.16 - \$.19/connection  |
| Hand Wire Wrap    | \$.11 - \$.12/connection  |
| Machine Wire Wrap | \$.04 - \$.045/connection |

### *Military*

|                   |                            |
|-------------------|----------------------------|
| Weld              | \$.35 - \$.50/connection   |
| Solder            | \$.25 - \$.30/connection   |
| Hand Wire Wrap    | \$.12 - \$.13/connection   |
| Machine Wire Wrap | \$.045 - \$.055/connection |

- 3.** The cost of Wire Wrap connections is affected by a variety of factors such as wire size, system density, etc. To refine the cost savings figure arrived at in #1 of these instructions, please call Mr. Charles Russ, Manager of Wire Wrapping Service, collect at (617) 899-8400 extension 2668. He will be pleased to provide firm quotations based on your specific application.

Raytheon Company, Wire Wrap Service  
20 Seyon Street, Waltham, Mass.

**RAYTHEON**

\*Average cost based on experience to date

MR. C. E. RUSS, MANAGER, WIRE WRAPPING SERVICE  
RAYTHEON COMPANY  
20 SEYON STREET, WALTHAM, MASS. 02154

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The following people are interested in attending a seminar on wire wrapping techniques.

Name \_\_\_\_\_ Title \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

*(use reverse side for additional names)*

Best date is \_\_\_\_\_

Day      Month

My Name \_\_\_\_\_

Title \_\_\_\_\_

List two alternate dates. \_\_\_\_\_

Company \_\_\_\_\_

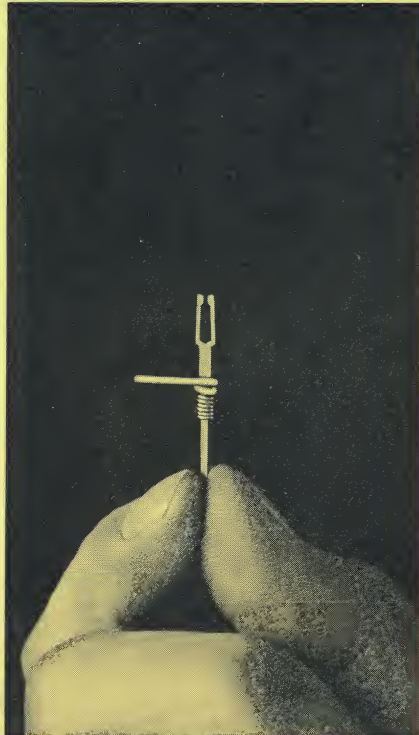
Best time is \_\_\_\_\_

Address \_\_\_\_\_

A suitable place for the seminar ☐ is ☐ is not available.

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

GM11-315M366



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BUSINESS REPLY MAIL

No Postage Stamp Necessary If Mailed in the United States

Attn: Mr. Charles E. Russ, Manager  
Wire Wrapping Service  
Raytheon Company  
20 Seyon Street  
Waltham, Mass. 02154

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